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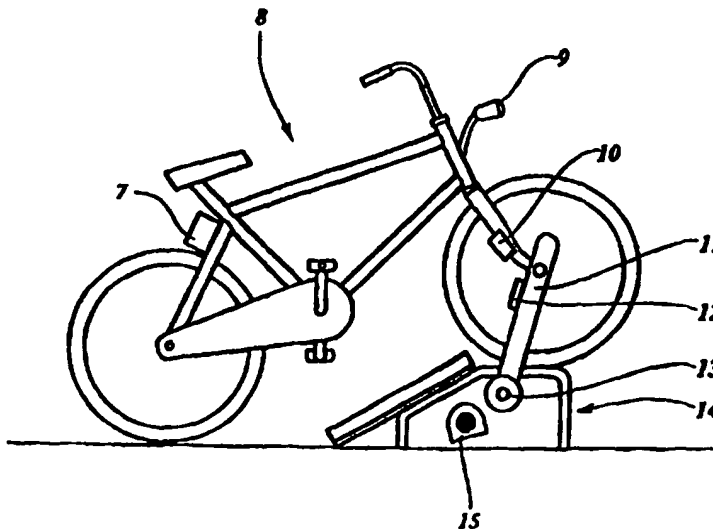
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(54) Title: METHOD OF MAKING BICYCLES AVAILABLE IN SEVERAL STORAGE PLACES; AS WELL AS A STORAGE PLACE FOR STORING BICYCLES, AND A BICYCLE FOR USE WITH THE STORAGE PLACE



(57) Abstract

The invention relates to a method of making bicycles available in several storage places (1), as well as to a storage place for storing bicycles and to a bicycle (8) for use with the storage place. The making available of bicycles (8) in several storage places (1) is done by the users of the bicycles, and to that end a control system (6) exists, to which the user makes it known to what destination he intends to ride, whereby a storage position (3, 14) is reserved in a storage place (1) located near said destination, so that the user will be able to place the bicycle (8) in a storage position (3, 14) intended for that purpose again, which storage position is connected to the control system (6). In order to make it possible to place the bicycles in a storage position in a simple manner, said storage position is fitted with a lockable lever comprising a clamp, in which the bicycle is locked in position by moving the lever.

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Method of making bicycles available in several storage places; as well as a storage place for storing bicycles, and a bicycle for use with the storage place.

The invention relates to a method of making available bicycles provided with identification means, which are present and locked in position in storage places comprising a limited number of storage positions, wherein a control
5 system controls the storage places and storage positions, possibly receives or registers payments and locks and unlocks bicycles.

Such methods are known, inter alia from plans to have the bicycles form part of a public transport scheme in
10 an urban area, whereby the users can take bicycles from a storage facility after identification and/or payment and ride them to a next storage facility.

The drawback of the known methods is that in practice too many bicycles will arrive at certain storage
15 places at the same time, for example near destinations which are popular at that moment, as a result of which not all of said bicycles can be stored in the storage place and use by unauthorized persons becomes possible. In addition to that the control system will no longer know the location of the
20 bicycles and the bicycles will be reported missing. A consequence of this is that the whereabouts of the bicycles are unknown and that it is no longer possible to carry out control measures to ensure that bicycles will be available at all storage places at all times.

25 The object of the invention is to overcome the above drawback and in order to accomplish that objective the user inputs the storage place he wishes to ride to into the control system via a communication module, and a bicycle is unlocked after an empty storage position has been reserved
30 at that storage place.

By this measure it is achieved that a user will always be able to store his bicycle at a storage position

that has been reserved for him. As a result of this situations where users are unable to store his bicycle can no longer occur and the users are stimulated to return the bicycles to the storage places.

5 According to a further improvement of the invention the control system indicates the storage places where storage positions are available after the user has stated his destination via the communication module, and furthermore the control system indicates what storage places located
10 near a particular destination have more or fewer storage positions available by displaying different rental prices.

 By informing the user directly what storage places have a storage position available, the user is enabled to make a selection from the available possibilities that
15 optimally suits him, and by stimulating the user to select as his destination particular storage places which have too few bicycles at that point in time, for example by making a bicycle available at a lower rental price, the control system is able to ensure that sufficient bicycles will be
20 available at as many storage places as possible at all times, and also that there will be sufficient storage positions to be reserved at the storage places at all times.

 According to another improvement of the invention the control system activates a signalling device at a
25 storage place when most storage positions or all storage positions are occupied or have been reserved.

 By indicating clearly at a storage place that the storage positions are occupied or reserved, the user is informed that it is possible to rent bicycles on attractive
30 terms, or possibly that a compensation will be paid if the bicycles are taken to an empty storage place. In this manner people are stimulated to take bicycles to storage places where there is a need for bicycles. Possibly a compensation will be paid instead of costs being charged, so that users
35 can for example generate an income by transporting the bicycles between storage places, this in order to distribute

the bicycles as evenly as possible over the various storage places.

According to another improvement of the invention the reservation of the storage position is cancelled by the control system after an adjustable period of time.

Cancelling the reservation if the bicycle has not come in after a predetermined period of time will prevent situations where a reservation is maintained unnecessarily long if the bicycle is not left behind at a storage place by the user, which may prevent other users going to that particular storage place.

According to another aspect of the invention the control system unlocks the bicycle by releasing the locking means forming part of the storage position, after which the user unlocks the bicycle by moving the locking means.

Having the locking means moved by the user makes it possible to use a sturdy construction for the locking means, without powerful driving means being required for this purpose.

According to another improvement of the method according to the invention the control system locks the bicycle by blocking the locking means forming part of the storage position after the user has placed the bicycle into the locking means and moved it to the locking position.

Improper use of the bicycles is prevented by this measure.

The invention furthermore comprises a device for placing and locking bicycles into an unmanned storage place comprising a plurality of storage positions provided with locking means to be operated by users.

Such devices are known as unmanned bicycle storage facilities, which are often awkward to use, due to the large number of operations which the user is required to carry out.

In order to avoid this drawback the locking means comprise a movable lever provided with a clamp which is capable of surrounding part of a bicycle, and which can be

operated by moving the lever. A device which is simple to operate is obtained by operating the locking means by means of a lever, which is secured to the bicycle with a clamp.

According to another improvement the lever comprises a locking device to be operated by the user, by means of which said lever can be locked in a closed or in an open position. Locking the lever rather than the bicycle, for example, makes it possible to provide a storage place for bicycles of various dimensions, which can be readily standardized.

According to one embodiment the locking device is connected to a control system. This makes it possible to connect the storage facility to a payment system or to an identification system.

According to one embodiment the storage position is provided with reading means connected to a control system for determining the identity of the bicycle which is present in the storage position or which is to be placed into said storage position. This makes it possible to restrict the use of the storage facility to bicycles which are known to the control system.

According to one embodiment the locking means comprise two levers to be moved synchronously, between which a part of a bicycle can be placed and be locked in position. As a result of this the bicycle is positioned and locked in the storage position at the same time, so that the bicycles can be placed in side-by-side relationship in a compact manner.

According to another improvement the locking means comprise two levers to be disposed on either side of a bicycle wheel, which levers are capable of pivoting movement about a pivot pin disposed outside the circumference of the bicycle wheel, whereby the locking operation is coupled to the pivoting movement of the levers. As a result of this the levers can be caused to make the movement required for said locking in a simple manner by moving the bicycle.

According to another improvement the lever is provided with an electrical contact connected to the control system, which connects the control system to a bicycle after the bicycle has been placed between the levers. By fitting
5 the bicycle with a control unit, in which various data are stored, such as the distance covered, and by means of which for example the lighting system can be turned on and off, various extra facilities can be made available to the users.

The invention furthermore comprises a bicycle to be
10 used in the above-described bicycle storage facility, wherein bushes, possibly of a hardened material, are mounted on an axle, which bushes are capable of co-operation with two levers which form part of a bicycle storage facility, whereby each lever comprises a lockable clamping device,
15 which is capable of co-operation with said bushes, and whereby said bushes are configured such that they cannot be removed from the front wheel axle when the bicycle is placed between the levers. Nearly all bicycle axles have the same dimensions and constitute that part of the bicycle which can
20 be secured in a simple manner. By fitting the axle with bushes, possibly of a hardened material, an attachment is obtained which can be secured in the fork of a bicycle storage facility in a simple manner.

According to one improvement of the bicycle the
25 bushes are fully rounded on the outer side, and they are configured as nuts or comprise a nut which is screwed onto the axle. This makes it impossible to remove the part of the bicycle that is secured in the fork, and the bicycle cannot be removed without detaching the clamping device.

30 According to another improvement a contact point is provided on the inner side of a bush. As a result of this a microprocessor or a battery present in the bicycle can be connected to the control system in a simple manner.

The invention will be explained in more detail
35 hereafter by means of a few embodiments, with reference being made to a drawing, in which:

Fig. 1 diagrammatically shows a number of storage places;

Fig. 2 diagrammatically shows a storage position and a bicycle placed therein;

5 Fig. 3 is a sectional view of the front wheel axle of a bicycle, as it can be locked in a storage position;

Figs. 4 and 5 show the storage position and the locking device, wherein the bicycle is moved down upon being

10 Figs. 6 and 7 show a storage position corresponding with Figs. 4 and 5, wherein the bicycle is moved up upon being locked;

Figs. 8 - 12 show the blocking of the locking engagement; and

15 Fig. 13 shows the blocking of the locking engagement in a second embodiment thereof.

Like parts are numbered alike as much as possible in the various Figures..

20 Fig. 1 shows a number of storage places 1 comprising storage positions 3 for storing bicycles which can be lent to people. The user thereby takes a bicycle from a first storage place 1 and goes to a second storage place 1 located elsewhere in the town in question, where he places the bicycle into an empty storage position 3 again.

25 In order to be sure that it will be possible to store the bicycle in the second storage place 1 upon arrival, the storage position 3 in second storage place 1 is reserved before the bicycle can be taken out of the first storage place. To that end the various storage places are in
30 communication with each other via an information network 2, and the various operations that are required are carried out by means of a control system 6.

The user identifies himself via a control panel 4 and states his destination. The control system 6 verifies
35 whether the user is authorized to borrow a bicycle and whether empty storage positions 3 are available in the storage place 1 located near said destination. If there are

empty storage positions 3 which have not been reserved yet, one of said positions will be reserved for the bicycle to be lent to the user, and a bicycle will be released, after which the user can take the bicycle out of storage position 3.

5 After the user has stated his destination, the control panel 4 will also display other storage places 1 located near his destination, whereby also the amounts that will be charged for the various destinations will be shown. The control system 6 thereby calculates the charges on the
10 basis of the number of empty storage positions 3 which have not been reserved yet, whereby the charges will be lower if there are many empty storage positions 3 which have not been reserved yet.

 Furthermore it is possible that if a user shows up
15 at a storage place 1 where few, if any, empty positions are available, he will be paid rather than charged an amount if he takes a bicycle to a storage place 1 where there are not enough bicycles. A signalling device, which for example comprises a warning light 5, is provided at storage place 1
20 in order to draw the users' attention to this.

 Fig. 2 shows a bicycle which is stored in a storage position 14. Bicycle 8 is provided with a battery 7, a lighting system 9 and a transponder 10, by means of which the bicycle in question can be identified. Each storage
25 position comprises two synchronously moving supporting legs 11, between which a front wheel hub 18 (see Fig. 3) of bicycle 8 is fixed in a manner yet to be indicated hereafter. Supporting legs 11 are capable of pivoting movement about a pivot pin 13, whereby said pivoting about pivot pin
30 13 causes front wheel hub 18 to be locked in supporting legs 11. Said pivoting movement can be blocked by means of a blocking system comprising a drive shaft 15, by means of which a number of storage positions 14 can be blocked at the same time. An antenna 12 is mounted on one of the supporting
35 legs 11, by means of which antenna transponder 10 can be read. Besides the configuration comprising an antenna 12 and a transponder 10, also other configurations may be used for

identifying bicycle 8, for example a configuration comprising a bar code reader, which reads a bar code affixed to bicycle 8.

Once the user has selected a destination and a storage position 3 has been reserved, bicycle 8 can be removed, whereby the lighting system may be turned on. Upon arrival at the destination the bicycle is placed into an empty storage position 14, after which bicycle 8 is identified by means of antenna 12, and control system 6 determines whether a storage position 14 has been reserved for the bicycle in question. If this is the case, or if there are sufficient empty positions, bicycle 8 will be accepted, possibly with extra costs being charged in that case, whereby the blocking system releases the locking of supporting legs 11 and the bicycle can be pushed forward, whereupon it is fixed in position between supporting legs 11.

In the event that no storage position 14 has been reserved for bicycle 8 in the storage place 1 in question, and insufficient free positions are available, bicycle 8 will be rejected and cannot be delivered at storage place 1. If the user does not take bicycle 8 to the destination he has previously stated as yet, but the bicycle is for example parked by the roadside, the user in question will be fined and will for example not be permitted to rent a bicycle for some time.

The point in time at which a bicycle was taken from a storage place 1 is stored in a memory. If bicycle 8 has not arrived at a destination at a point of time that has been input in the control system, it will be assumed that the user has left bicycle by the roadside, and he will be fined. Since the distance between the various storage places may vary strongly, the control system can adapt the input time in dependence thereon. Furthermore it is conceivable that the user reserves extra time, or that the local situations at the various storage places 1 is taken into account.

Fig. 3 shows the front wheel hub 18, which is mounted in a front fork 17. Mounted on the axle of front

wheel hub 18 are bushes 16 and 19, which are for example made of a hardened material, and which ensure that the axle of front fork 18 of a bicycle 8 present in storage position 14 cannot be unscrewed from fork 17. A plug of plastic material is provided in bush 19, which plug comprises an electrical contact, by means of which voltage can be supplied to battery 7, so that sufficient voltage will be available for lighting system 9 and transponder 10 at all times. In another embodiment electrical contacts 20 may be provided in both bushes 16 and 19, possibly for the supply of electric power to battery 7, but also for communication between control system 6 and a microprocessor present on the bicycle, which also carries out the identification of bicycle 8, for example, instead of transponder 10.

In another embodiment of bushes 16 and/or 19 said bushes consist of two mutually isolated parts, which come into contact with different parts of supporting legs 11 or the locking device present therein. Furthermore transponder 10 may be accommodated in said bushes, whereby the transponder is protected by a supporting leg 11 and bush 16 or bush 19 during storage.

Figs. 4 and 5 are detailed views of the supporting leg 11 shown in Fig. 2, whereby Fig. 4 shows the open position of supporting leg 11 at 24. A locking slide 26 is slidably provided in a sleeve 23. Locking slide 25 is provided with a recess 21, which slide is capable of co-operation with a locking slot 22 in sleeve 23. In the position shown in Fig. 4 a bush 16 or 19 can be inserted into recess 21 from the right or from the left. After locking slide 25 has been moved down in sleeve 23, as is illustrated in Fig. 5, which shows the closed position 33 of the supporting leg, recess 21 is closed by the wall of the sleeve and the bush, which has been moved downward, cannot be moved out of recess 21 any more and is thus locked in position. The locking engagement is not complete yet in a central position 32 of the supporting leg as shown in Fig.

4, but the bush cannot be moved into or out of recess 21 any more.

Locking slide 25 is moved by means of lever 26, which is attached to the housing of the pivot pin of the supporting leg. Also attached to said pivot pin are a first
5 rocker 28 and a second rocker 30, which are actuated by a cam disc 29 comprising a shaft, which rockers 28 and 30 interact with a blocking pin 31 attached to sleeve 23. The operation of the rockers and blocking pin 31 will be discus-
10 sed hereafter with reference to Figs. 8 - 12.

In the illustrated construction the shaft of cam disc 29 is driven by a motor (not shown), whereby one motor drives the cam disc for a number of storage positions, as a result of which the costs per storage position remain low.
15 Of course it is also conceivable that each storage position is fitted with an independently driven locking device, whereby it is possible to verify at all times, also in a central position 32, whether only one bicycle is being placed into the storage position in question or removed
20 therefrom.

Figs. 6 and 7 show the same supporting leg 11 as Figs. 4 and 5, whereby bicycle 8 is moved upwards upon being locked. By disposing the construction shown in Figs. 4 and 5 and the one shown in Figs. 6 and 7 in alternating relations-
25 hip, the handlebars of the bicycles 8 present in storage positions 3 will be positioned at different heights, as a result of which bicycles 8 can be placed closer together and storage places 1 will occupy less space.

Figs. 8 - 12 show how the movement of supporting leg 11 about pivot pin 13 is blocked. The cam disc comprising shaft 29 is shown in a neutral position 34, a first released position 35, and a second released position 36. The pivoting movement of supporting leg 11 can be blocked by rockers 28 and 30, in that said rockers stop blocking pin
30 31. Rockers 28 and 30 and blocking pin 31 are only shown diagrammatically, they are for example pressed against cam disc 29 by means of springs (not shown).
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In the neutral position 34 the movement of supporting leg 11 is blocked, in the first released position 35 supporting leg 11 can only move from the open position 24 to the central position 32 and vice versa, and in the second
5 released position 36 supporting leg 11 can only move from the closed position 33 to the central position 32 and vice versa.

The movements of the two coupled supporting legs 11 are detected by sensors (not shown), which are connected to
10 control system 6, and when a bicycle is being placed or removed from the storage position, the locking engagement is not released before it is ensured that supporting legs 11 are in their central position.

Fig. 13 shows the blocking of the movement of
15 supporting leg 11 about pivot pin 13 in a second embodiment thereof. Supporting leg 11 having a central axis 40 is attached to a disc 41, to the outer circumference of which a cam 42 is attached. The pivoting movement of supporting leg 11 about pivot pin 13 is limited in that cam 42 strikes one
20 of the stops 43. The supporting leg is maintained in an extreme position in that a catch 44 is moved towards disc 41 by a spring 46 after cam 42 has passed, thus blocking the pivoting movement.

The position of catch 44, on which a magneto 51 is
25 mounted, is detected by means of a sensor 52, which is mounted on a control module 48. The control system thus knows whether supporting leg 11 is locked or not. The detection of the position of supporting leg 11 takes place by detecting the position of disc 41 and the magneto 49
30 mounted thereon by means of a sensor 50. Each storage position 14 may be fitted with its own separate control module 48, or one control module 48 may be provided for each storage place 1, all control modules 48 are connected to the central control system 6, however, so that the system will
35 know whether a storage position 14 is locked or not.

Control module 48 is connected, in a manner not shown, to a contact point in supporting leg 11, which is

capable of establishing a connection with a bicycle 8 to be placed between supporting legs 11.

An actuator 45 is driven via a cable 47 from control module 48 in order to release supporting leg 11.

5 This causes catch 44 to pivot and release cam 42, as a result of which disc 41 and thus supporting leg 11 can pivot about pivot pin 13, causing locking slide 25 to move. As a result of this a bicycle 8 is either locked in position or released.

10 It has become apparent that besides the above-described use of a storage place 1 in rental system for bicycles which comprises several storage places, storage place 1 may also be used advantageously in a rental system for bicycles at a railway station. Storage place 1 comprising storage positions 3 is thereby used by approximately
15 twice as many bicycles 8 as there are storage positions 3. Bicycles 8 are used by commuters, whereby fifty per cent of the commuters live near the station where storage place 1 is located, and the other fifty per cent of the commuters work
20 in the place in question. In this way fifty per cent of the bicycles will be present at the addresses where the users work or live, whilst the other fifty per cent may be present in a storage position 3. The storage positions 3 are released by the control system of the storage place 1 if the
25 bicycle 8 is recognized and is authorized to use the storage facility. The control system may thereby be programmed in such a manner that the place is for example only released before or after a predetermined point in time.

CLAIMS

1. A method of making available bicycles (8) provided with identification means (10), which are present and locked in position in storage places (1) comprising a limited number of storage positions (3, 14), wherein a
5 control system (6) controls the storage places and storage positions, possibly receives or registers payments and locks and unlocks bicycles, **characterized in that** the user inputs the storage place (1) he wishes to ride to into the control system (6) via a communication module (4), and a bicycle (8)
10 is unlocked after an empty storage position (3, 14) has been reserved at that storage place.

2. A method according to claim 1, **characterized in that** the control system (6) indicates the storage places (1) where storage positions (3, 14) are available after the user
15 has stated his destination via the communication module (4), and furthermore the control system (6) indicates what storage places (1) located near a particular destination have more or fewer storage positions (3, 14) available by displaying different rental prices.

3. A method according to claim 1 or 2, **characterized in that** the control system (6) activates a signalling device (5) at a storage place (1) when most storage positions (3, 14) or all storage positions (3, 14) are occupied or
20 have been reserved.

4. A method according to any one of the preceding claims, **characterized in that** the reservation of the storage position (3, 14) is cancelled by the control system (6)
25 after an adjustable period of time.

5. A method according to any one of the preceding claims, **characterized in that** the control system (6) unlocks the bicycle (8) by releasing the locking means (23, 25)
30 forming part of the storage position (3, 14), after which the user unlocks the bicycle by moving the locking means.

6. A method according to any one of the preceding claims, **characterized in that** the control system (6) locks the bicycle (8) by blocking the locking means (23, 25) forming part of the storage position after the user has placed the bicycle into the locking means and moved it to the locking position.

7. A device for placing and locking bicycles (8) into an unmanned storage place comprising a plurality of storage positions (3, 14) provided with locking means (23, 25) to be operated by users, **characterized in that** the locking means comprise a movable lever (24, 33) provided with a clamp which is capable of surrounding part of a bicycle (8), and which can be operated by moving the lever.

8. A device according to claim 7, **characterized in that** the lever (24, 33) comprises a locking device (15, 28-31) to be operated by the user, by means of which said lever can be locked in a closed or in an open position.

9. A device according to claim 7 or 8, **characterized in that** the locking device (15, 28-31) is connected to a control system (6).

10. A device according to any one of the preceding claims, **characterized in that** the storage position (3, 14) is provided with reading means (12) connected to a control system (6) for determining the identity of the bicycle (8) which is present in the storage position or which is to be placed into said storage position.

11. A device according to any one of the preceding claims, **characterized in that** the locking means (23, 25) comprise two levers (11, 24, 33) to be moved synchronously, between which a part of a bicycle (8) can be placed and be locked in position.

12. A device according to claim 11, **characterized in that** the locking means (23, 25) comprise two levers (11, 24, 33) to be disposed on either side of a bicycle wheel, which levers are capable of pivoting movement about a pivot pin (13) disposed outside the circumference of the bicycle

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wheel, whereby the locking operation is coupled to the pivoting movement of the levers.

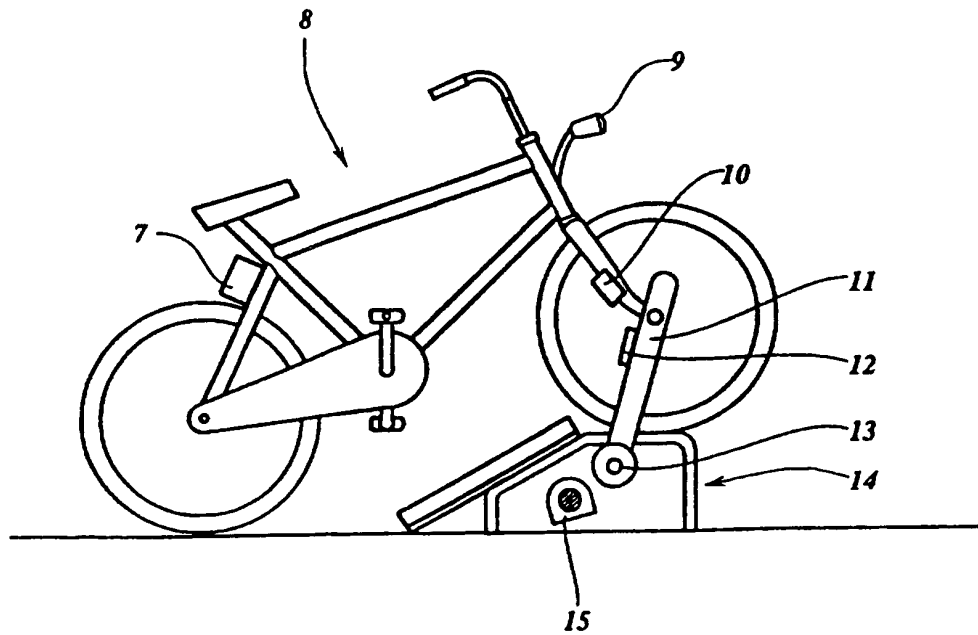
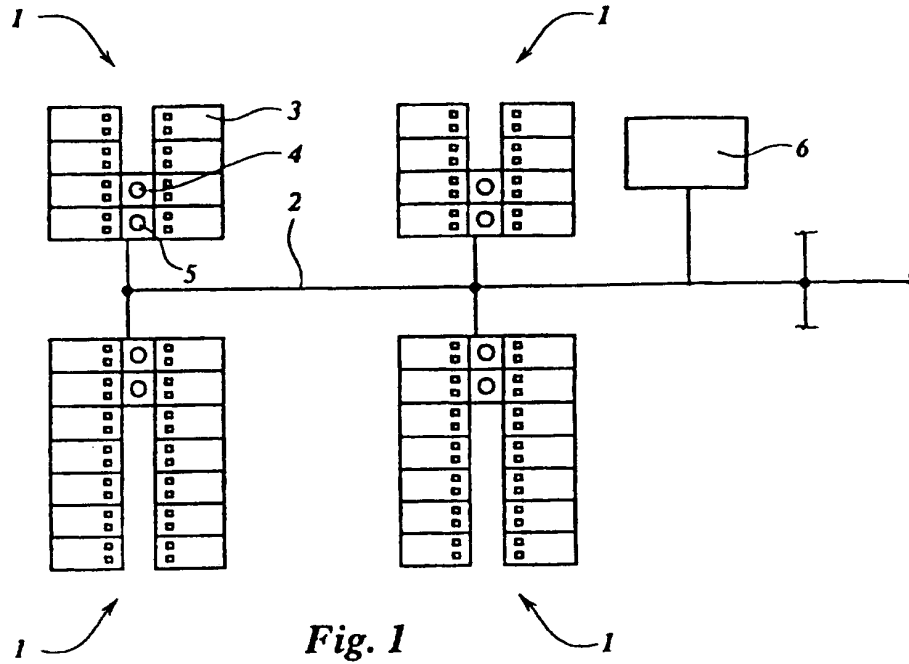
13. A device according to claim 11 or 12, **characterized in that** the lever (11, 24, 33) is provided with an electrical contact connected to the control system, which connects the control system (6) to a bicycle (8) after the bicycle has been placed between the levers.

14. A bicycle, wherein bushes (16, 19), possibly of a hardened material, are mounted on an axle, which bushes are capable of co-operation with two levers (11, 24, 33) which form part of a bicycle storage facility, whereby each lever comprises a lockable clamping device, for example as referred to in any one of the claims 7 - 13, which is capable of co-operation with said bushes, wherein said bushes are configured such that they cannot be removed from the front wheel axle when the bicycle is placed between the levers.

15. A bicycle according to claim 14, **characterized in that** the bushes (16, 19) are fully rounded on the outer side, and they are configured as nuts or comprise a nut which is screwed onto the axle.

16. A bicycle according to claim 14 or 15, **characterized in that** at least one of said bushes (16, 19) is provided with a contact point (20).

17. A bicycle according to claim 16, **characterized in that** at least one of said bushes (16, 19) is provided with two electric connections, which can be connected to a lever (11, 24, 33).



SUBSTITUTE SHEET (RULE 26)

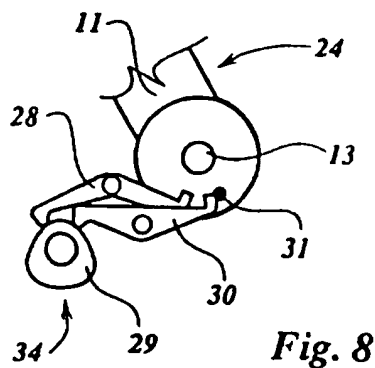


Fig. 8

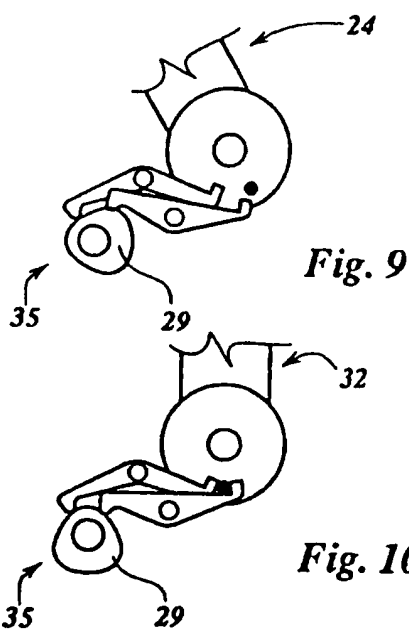


Fig. 9

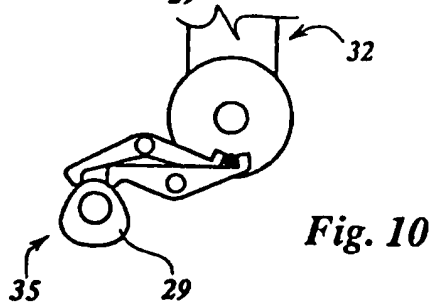


Fig. 10

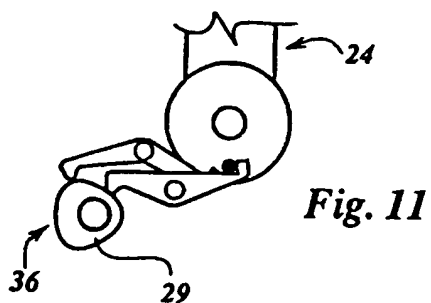


Fig. 11

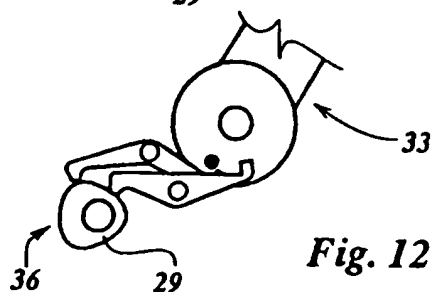


Fig. 12

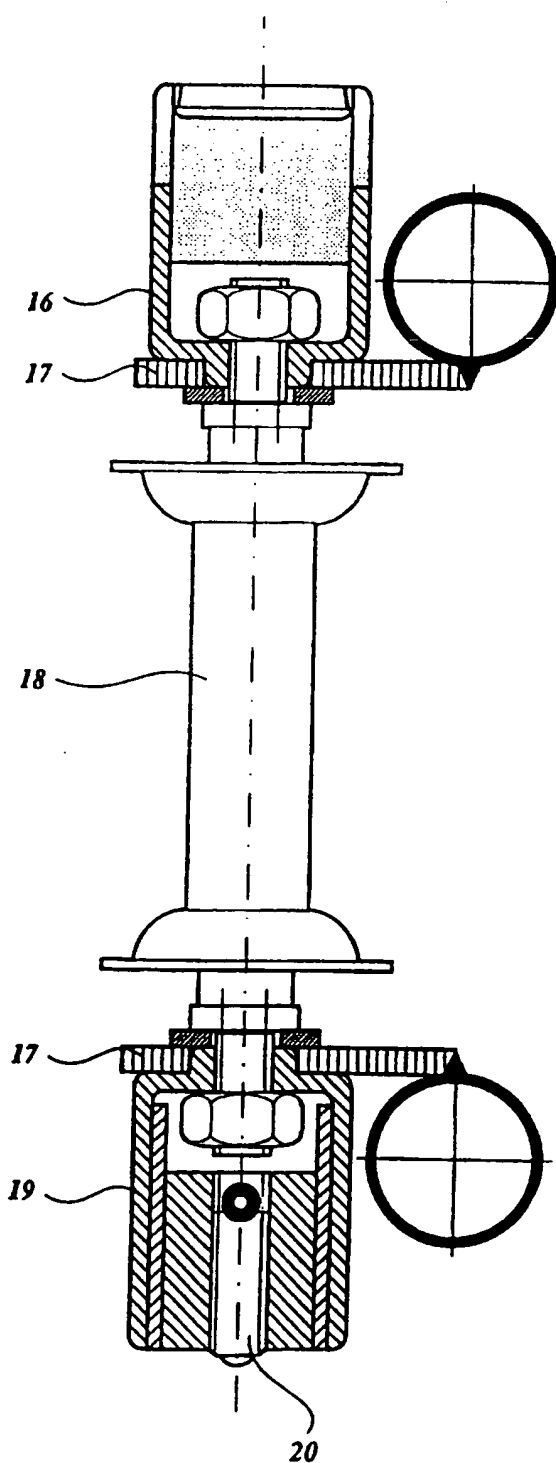


Fig. 3

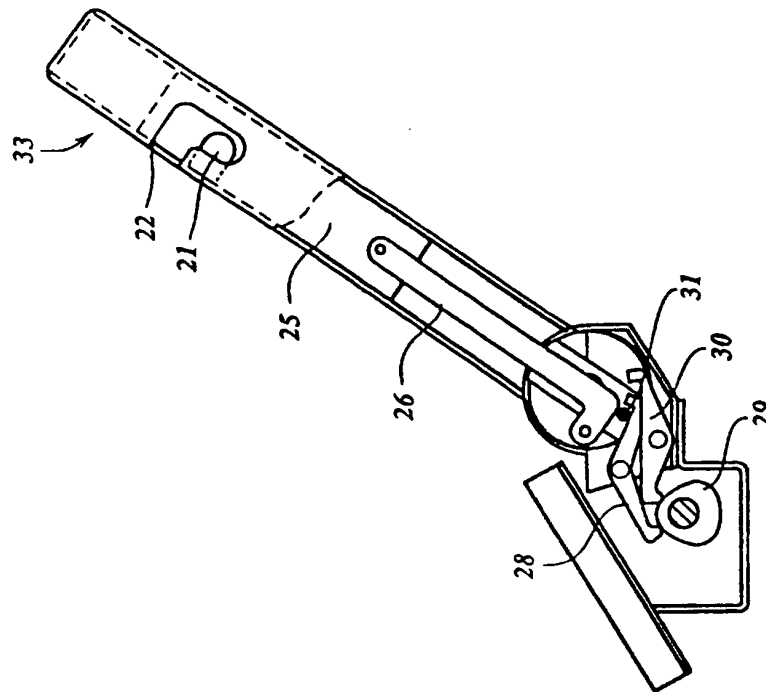


Fig. 5

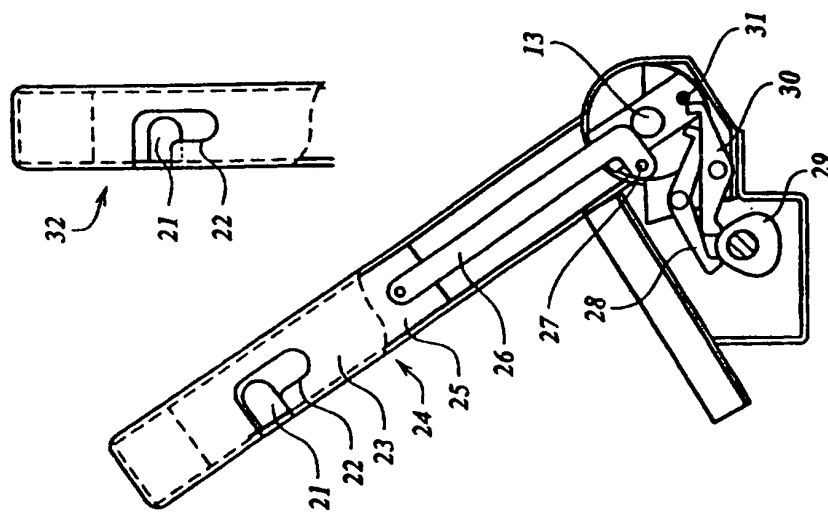


Fig. 4

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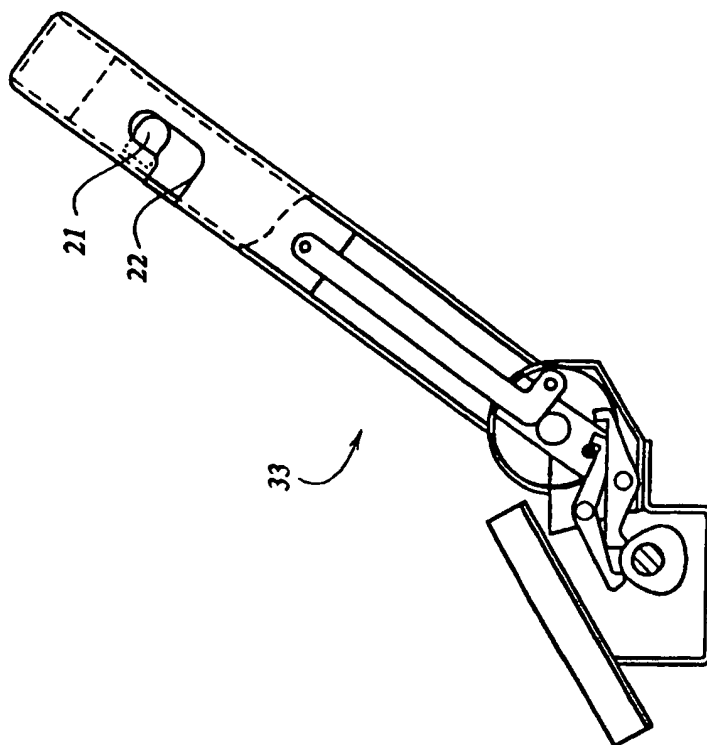


Fig. 7

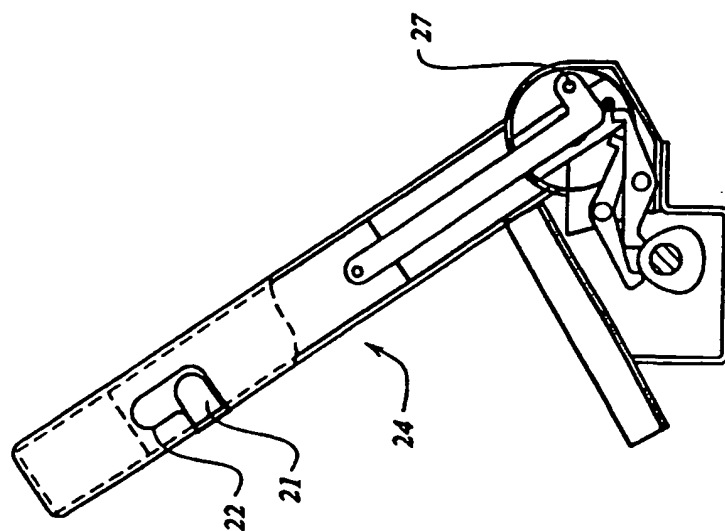
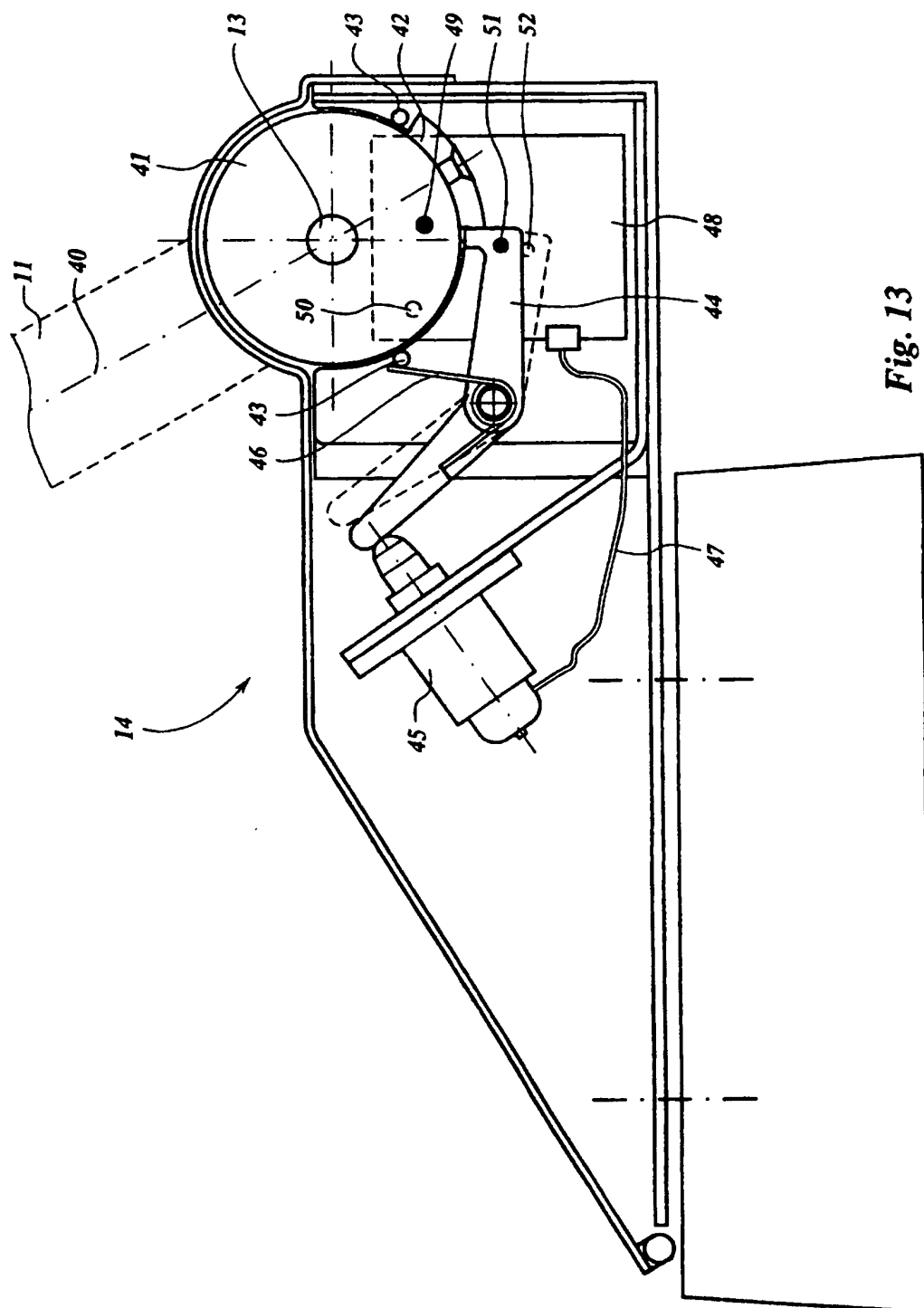


Fig. 6

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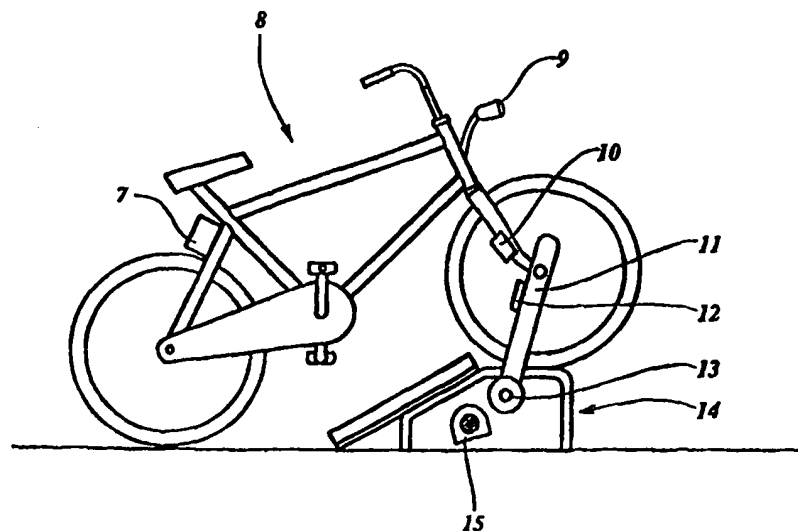
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(71)(72) Applicant and Inventor: SCHIMMELPENNINK, Laurens, Maria, Hendricus [NL/NL]; Amstel 59, NL-1018 EJ Amsterdam (NL).			
(72) Inventor; and			
(75) Inventor/Applicant (for US only): PRINS, Antoon, Adrianus [NL/NL]; Wittenburgergracht 29, NL-1018 MV Amsterdam (NL).			
(74) Agent: METMAN, Karel, Johannes; De Vries & Metman B.V., Gebouw Autumn, Overschiestraat 184 N, NL-1062 XK Amsterdam (NL).		<p>Published</p> <p><i>With international search report.</i></p> <p><i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p> <p><i>In English translation (filed in Dutch).</i></p>	
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(54) Title: METHOD OF MAKING BICYCLES AVAILABLE IN SEVERAL STORAGE PLACES; AS WELL AS A STORAGE PLACE FOR STORING BICYCLES, AND A BICYCLE FOR USE WITH THE STORAGE PLACE



(57) Abstract

The invention relates to a method of making bicycles available in several storage places (1), as well as to a storage place for storing bicycles and to a bicycle (8) for use with the storage place. The making available of bicycles (8) in several storage places (1) is done by the users of the bicycles, and to that end a control system (6) exists, to which the user makes it known to what destination he intends to ride, whereby a storage position (3, 14) is reserved in a storage place (1) located near said destination, so that the user will be able to place the bicycle (8) in a storage position (3, 14) intended for that purpose again, which storage position is connected to the control system (6). In order to make it possible to place the bicycles in a storage position in a simple manner, said storage position is fitted with a lockable lever comprising a clamp, in which the bicycle is locked in position by moving the lever.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/NL 97/00487

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 G07B15/04 B62H5/00 B62H3/04 G08G1/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G07B B62H G08G

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Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 773 020 A (ANDERSON ET AL.) 20 September 1988 see claims; figures ---	1
A	NL 9 100 212 A (N.V. NEDERLANDSCHE APPARATENFABRIEK) 1 September 1992 ---	1
A	EP 0 646 897 A (ROBERT BOSCH GMBH) 5 April 1995 see claims; figure 1 ---	1
A	US 4 894 654 A (SERENBETZ) 16 January 1990 see column 4, line 3 - line 17 ---	1
-/-		

☒ Further documents are listed in the continuation of box C.

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17 December 1997

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

Intern. Application No
PCT/NL 97/00487

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>PATENT ABSTRACTS OF JAPAN vol. 095, no. 004, 31 May 1995 & JP 07 021426 A (NIPPON SIGNAL CO LTD:THE;OTHERS: 02), 24 January 1995, see abstract</p> <p>-----</p>	1

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NL 97/ 00487

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

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International Application No

PCT/NL 97/00487

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NL 9100212 A	01-09-92	NONE	
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US 4894654 A	16-01-90	NONE	

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